Date of Report: 8/21/2020

BURNED-AREA REPORT

PART I - TYPE OF REQUEST

A. Type of Report

☒ 1. Funding request for estimated emergency stabilization funds
☐ 2. No Treatment Recommendation

B. Type of Action

☐ 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

☒ 2. Interim Request #3
☐ Updating the initial funding request based on more accurate site data or design analysis

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: Bush

B. Fire Number: AN-TNF-001581

C. State: Arizona

D. County: Gila and Maricopa

E. Region: Southwestern Region

F. Forest: Tonto NF

G. District: Mesa and Tonto Basin

H. Fire Incident Job Code: P3M6M6

I. Date Fire Started: 6/13/2020

J. Date Fire Contained: 7/4/2020

K. Suppression Cost: 9,400,000

L. Fire Suppression Damages Repaired with Suppression Funds (estimates):
1. **Fireline repaired (miles):**
2. **Other (identify):**

M. Watershed Numbers:

Table 1: Acres Burned by Watershed

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
150601030910	Cottonwood Creek-Salt River	14754	4	0.03
150601050311	Hardt Creek-Tonto Creek	17417	2823	16.21
150601050402	Slate Creek	18390	12223	66.47
150601050403	Packard Wash-Tonto Creek	23721	7680	32.38
150601050406	Lambing Creek-Tonto Creek	33398	20076	60.11
150601050407	Sycamore Creek	11885	4905	41.27

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
150601050409	Ash Creek-Tonto Creek	13919	2117	15.21
150601050501	Rock Creek	13861	11370	82.02
150601050503	Bumblebee Creek-Tonto Creek	17966	7898	43.96
150601050504	Mills Canyon-Tonto Creek	21348	7557	35.40
150601060102	Buckhorn Creek-Salt River	18337	7999	43.62
150601060103	Salt River-Apache Lake	29454	12380	42.03
150601060108	Salt River-Canyon Lake	18188	1203	6.61
150601060109	Cane Spring Canyon	8107	6824	84.17
150601060110	Cottonwood Creek	32628	27173	83.28
150601060112	Jones Canyon	12000	3728	31.06
150601060113	Salt River-Saguaro Lake	12344	24	0.19
150601060302	Bulldog Canyon-Salt River	39444	631	1.60
150602030601	Upper Sycamore Creek	39506	16347	41.38
150602030602	Rock Creek	9851	9691	98.37
150602030603	Mesquite Wash	12666	12372	97.68
150602030604	Middle Sycamore Creek	32885	12394	37.69
150602030605	Lower Sycamore Creek	26696	5753	21.55

N. Total Acres Burned:

Table 2: Total Acres Burned by Ownership

OWNERSHIP	ACRES
NFS	192,412
OTHER FEDERAL (LIST AGENCY AND ACRES)	
STATE	
PRIVATE	43
TOTAL	192,455

O. Vegetation Types:

Elevation within the Bush Fire footprint ranges from 1,663 to 7,648 feet. This range of elevation covers many unique ecosystems including Sonoran Desert, Semi-Desert grassland, Juniper grassland, Pinyon-Juniper woodland, Interior Chaparral, and Ponderosa Pine forest. Dominant vegetation types in the Sonoran Desert include Saguaro Cactus, Yellow Paloverde, and Jojoba. Semi-Desert grassland, which often exhibits poor soil condition, is dominated by woody species including Mesquite and Acacia. The characteristic species of the chaparral ecosystem are Mountain Mahogany, Manzanita, and Sonoran scrub oak. Pinyon-juniper woodlands include single leaf Pinyon pine, Alligator Juniper, and Redberry Juniper. The Ponderosa Pine ecosystems have an over story dominated by Ponderosa Pine with alligator juniper and Arizona white oak in the understory.

P. Dominant Soils:

Soil temperature and moisture regimes vary greatly across the elevational gradient within the Bush Fire footprint, and include aridic hyperthermic, aridic thermic, ustic thermic, and ustic mesic. This paired with the geologic diversity in the area leads to a wide range of soil classifications. The Sonoran Desert is dominated by Ustic Haplargids ranging from shallow to deep, including several different particle size classes and occurring primarily on granite. The semi-desert grasslands are dominated by Aridic Haplustalfs, which are primarily deep, occurring on granite or sandstone. Soils in the Pinyon Juniper woodland and Chaparral systems vary between Typic Haplustalfs and Typic/Lithic Argiustolls. These soils are typically shallow to moderately deep, occurring on granite, schist, and sandstone. Finally, the Ponderosa Pine forests are dominated by Udic Argiustolls which are typically moderately deep, occurring on schist and granite.

Q. Geologic Types: Granite, Alluvium, and Schist,

R. Miles of Stream Channels by Order or Class:

Table 3: Miles of Stream Channels by Order or Class

STREAM TYPE	MILES OF STREAM
PERRENIAL	5.58
INTERMITTENT	222.39
EPHEMERAL	1591.1
OTHER (DEFINE)	

S. **Transportation System:**
Trails: *National Forest (miles):* 83.9 *Other (miles):*
Roads: *National Forest (miles):* 299 *Other (miles):* 27.25

PART III - WATERSHED CONDITION

A. Burn Severity (acres):

Table 4: Burn Severity Acres by Ownership

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	18,340			59	18,399	9.4
Low	80,278			139	80,417	41.3
Moderate	86,981			319	87,300	44.7
High	8,963			28	8,991	4.6
Total	194,562			545	195,107	100

B. Water-Repellent Soil (acres): 56,822

C. Soil Erosion Hazard Rating: 77,017

D. Erosion Potential: 1.23 tons/acres

E. Sediment Potential: 1.23 tons/acre

F. Estimated Vegetative Recovery Period (years): 5 years

G. Estimated Hydrologic Response (brief description):

Sixteen HUC 12 watersheds have more than 25% of their area within the burn area and 5 HUC 12 watersheds have more than 75% of their area within the burn area. Hydrologic response from the burn scar will be

significant (>100% increase) for 72% of the sub-watersheds modelled in the 2-year storm event and 66% of modelled sub-watersheds for the 10-year storm. For the 2-year storm event 23 of the 108 sub-basins modelled (21%) have increases of greater than 500% and an additional 32 sub-basins (30%) have increased from no runoff pre-fire to some amount of runoff post fire. For the 10-year storm event 30 of the 108 sub-basins modelled (28%) have increases of greater than 500% and an additional 5 sub-basins (5%) have increased from no runoff pre-fire to some amount of runoff post fire. A number of stream reaches and watersheds on the interior of the burn area have a greater than 50% likelihood of producing debris flows at modest 15-minute rainfall intensities between 12 and 24 mmh-1. The stream segments with the greatest likelihood of debris flows (>60%) occur in the southeastern portion of the burn area in the vicinity of Browns Peak and Four Peaks. Most watersheds are estimated to produce debris-flow volumes between 10,000 and 100,000 m^3. The three largest Upper Sycamore, Middle Sycamore and Cottonwood creek in the southern half of the burn area are estimated to produce debris-flow volumes between 10,000 and 100,000 m^3.

PART V - SUMMARY OF ANALYSIS

Introduction/Background

The Bush Fire burned 195,107 acrea of Sonoran Desert, Semi-Desert Grasslands, Pinyon Juniper grasslands, Interior Chaparal and Ponderosa pine forest on the Tonto National Forest. Forest Service Infrastucture, and cultrual Resources are extensive in the in the area. There are established camp grounds or recreation sites in the burn perimeter and down stream of the burn area. Dispersed recreation and camping is also extensive in the burned area. Forest Service Road 626 that leads to a Forest Service Mt. Ord Radio repeater had areas of low, moderate, and high soil burn sevrity in areas adjecent to the fire.Increased soil ersion in the areas has the potential to make road impassable due to increased sedimentation being deposited on roads and trails or increased erosion of the road. With increased erosion rate the occurrence of increase rolling rock, tree fall and other debris moving down hill can he increased due to the removal of the soil matrix that is holding them in place. Debris flow modeled by the USGS predicted the probablitlty of debris flows at the high elvations between 60-90%. Not only do these debirs flow pose a significant theat to the life and safety of individual in the area. Debris flow could destrory available road making it difficult for people to leave the a hazard area, but also make it difficult for recuers to enter into an area. Due to the loss of vegatative cover and change in soil properties changes are expected in the watershed response when compared to pre-fire conditions. These changes include increased peak flows, potential hyper concentrated flow, and debris flows. These change in watershed response pose a risk to indviduals inside the burn area and to within same watershed, but outside the burn area.

This assessment was completed remotely using resources inventories, remote sensing and appropriate models with limited ground truthing. If needed additonal on the ground assessments can be completed once the COVID-19 Environment improves.

A. Describe Critical Values/Resources and Threats (narrative):

Table 5: Critical Value Matrix

Probability of Damage or Loss	**Magnitude of Consequences**		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

1. **Human Life and Safety (HLS):**Risk to life and Safety is very high within and down gradient from the burned area due to increased runoff debris flows and rolling rocks. Forest Service users will be at risk on Roads, trails, and campsites in the burn area and at adjecent area describe in the specialist report.

2. **Property (P):**Forest Service Road 626 leads to the summit of Mt. Ord and the Mt. Ord Forest Service radio repeater. This repeater service as a critical communication resource for multiple districts on the

Tonto NF. Preventing the loss of this road is critical to maintain communication capabilities of multiple districts on the Tonto National Forest.

b. The Little Daisy Repository is a former mill site that contains approximately 550 cubic yards of mine tailings underneath a cap of clean soil in the vicinity of Sycamore Creek. The repository depends on vegetation for erosion control and slope stability. The Bush fire has burned over this repository and along with it the grass and some of the established juniper trees, making it susceptible to erosion from post-fire flooding.
c. Forest System trails are expected to be directly affected by post-fire events. Passages 20 and 21 of the AZNST were within the fire perimeter, experiencing immediate damage from the fire and becoming at risk to future flood events. Passage 22 of the AZNST is in danger of potential flood damage from post-fire events. Approximately 84 miles of non-motorized trails are expected to be at risk. The probability of damage and loss due to changes in hydrologic function and soil erosion to the physical condition of trail infrastructure due to post-fire storms is very likely because of the inherently steep slopes, varying soil types, and burn severity (see Recreation Resource Report and SBS trails overlay map). The recreation facilities or improvements in the fire area that are eligible for BAER treatments consist of 114.29 miles of non-motorized trails.
d. Forest System roads are expected to be affected by increased peak flows (flash flooding), hyper-concentrated flows and debris flows, and from rolling rocks, and falling limbs and trees. These events could over-top roads and/or plug culverts, resulting in damage or loss of road infrastructure. Major system roads that may be affected include FR143, FR11, and FR445.

3. **Natural Resources (NR):**Noxious and invasive weeds continue to play a role in fire ignition and behavior. The large fire growth in the Sonoran desert this year has been caused by a significant crop of red brome, an invasive species of grass. It is likely that the wet winter and spring moisture cycles of 2019 encouraged excessive growth of perennial and annual invasive grasses, including red brome, wild oats, fountain grass, and buffelgrass, throughout the Sonoran Desert.
    b. Threatened and Endangered Species critical values within the fire footprint include Mexican spotted owl (*Strix occidentalis lucida*) with designated critical habitat, Gila topminnow (*Poeciliopsis occidentalis occidentalis*), Desert pupfish (*Cyprinodon macularius*), and Golden eagle (*Aquila chrysaetos*). Also, FS is signatory to the Sonoran desert tortoise (*Gopherus morafkai*) candidate conservation agreement. Additionally, several T&E species and critical habitat occur along Tonto Creek and portions of Roosevelt Lake within the watersheds that may be affected by sedimentation, debris flows, decreased water quality, and disruptions in prey availability following rain events. These include; western yellow billed cuckoo (*Coccyzus americanus*) with proposed critical habitat, southwestern willow flycatcher (*Empidonax traillii extimus*) with designated critical habitat, Spikedace (*Meda fulgida*), northern Mexican gartersnake (*Thamnophis eques megalops*) with proposed critical habitat, and narrow-headed gartersnake (*Thamnophis rufipunctatus*) with proposed critical habitat.

4. **Cultural and Heritage Resources:**A review of the Tonto National Forest NRM database indicated there are 583 previously recorded sites within the Area of Potential Effect that includes the fire perimeter and downstream of the fire scar. Historic properties managed by federal land management agencies are ranked into three classes:

    I. Sites evaluated as eligible for inclusion in the National Register of Historic Places
    II. Sites recorded but not evaluated
    III. Sites evaluated as not eligible for inclusion in the National Register

    Of the 583 sites, 11 sites have been determined as Not Eligible to be listed to the National Register of Historic Places and are no longer a cultural resource management concern. The remaining 573 sites are either Unevaluated, Eligible, or Listed and must be considered for treatment.

B. Emergency Treatment Objectives: Ensure Human Life and Safety, and protect NFS values at risk

C. Probability of Completing Treatment Prior to Damaging Storm or Event:
Land: 50%
Channel: 0
Roads/Trails: 60%
Protection/Safety: 90%

D. Probability of Treatment Success

Table 6: Probability of Treatment Success

	1 year after treatment	*3 years after treatment*	*5 years after treatment*
Land	50	75	100
Channel			
Roads/Trails	50	75	100
Protection/Safety	70	80	100

E. Cost of No-Action (Including Loss): Possible Loss of Human life and or injury, damage to NFS roads and trails systems, continued spread of invasive weeds, loss of T&E species habitat.

F. Cost of Selected Alternative (Including Loss): N/A

G. Skills Represented on Burned-Area Survey Team:

☒ Soils ☒ Hydrology ☒ Engineering ☐ GIS ☒ Archaeology
☒ Weeds ☒ Recreation ☐ Fisheries ☒ Wildlife
☐ Other:

Team Leader:
Email: mark.casillas@usda.gov **Phone(s):** 505-842-3253
michael.a.martinez@usda.gov 602-225-5252

Forest BAER Coordinator:
Email: kelly.mottlacroix@usda.gov **Phone(s):** 602-225-5210

Team Members: *Table 7: BAER Team Members by Skill*

Skill	**Team Member Name**
Team Lead(s)	Andy Casillas, Mike Martinez
Soils	Rob Ballard, David Watson
Hydrology	Kelly Mott Lacroix, Alex Makic
Engineering	Michelle Tom
GIS	
Archaeology	Clint Dalton
Weeds	Ryan Nicholas
Recreation	Kelly Finely, Devin Quintana
Wildlife	Kelly Kessler

H. Treatment Narrative:

Following current guidance related to the COVID-19 environment. Initial treatments have been limited to those that protect Human life and Safety. Response actions for human life and safety included collaboration with multiple partners including NOAA, Gila County and Maricopa County along with Closure Gate and Warning Signs. Treatments for human life and safety have been initiated and are in various completion stages. Treatments to harden F626, the Mt Ord Road, were completed on July 24, 2020 at a total cost of $16,403.00. Procurement packages for gates have been submitted to AQM and are not yet awarded. Signs have been purchased at total cost of $19,965.00 and distributed to District staff for

installation. Now that these treatments are substantially underway, we have turned our attention towards treatments to protect other NFS values at risk.

Land Treatments: Treatments for Land, Channel, Roads, and Trails that protect natural resources, cultural resources, and Forest Service Infrastructure will be implemented once the COVID-19 environment improves and a brief reassessment is completed. These treatments are captured here in interim report #3.

Noxious and Invasive Weeds: The objective for noxious invasive weeds for the Bush fire is to perform a detection and removal process of invasive and noxious weeds, and to conduct a rapid integrated pest management strategy to ensure success. This treatment is estimated at $25,000 to enter into a contract or agreement to accomplish this work.

Threatened and Endangered Species: Natural recovery is recommended for all T&E resources except for Mud Springs, which provides habitat for Gila topminnow and desert pupfish. At Mud Springs we recommend the placement of wattles on the slope above four ponds to decrease erosion and the amount of sedimentation and ash flows into the springs. Additionally, we propose to install rip-rap over Jersey barriers on the south side of the south pond to reinforce the berm against erosion and possible breach. This treatment is estimated at $(b) (5) for material, and we anticipate that the Arizona Game and Fish Department will provide assistance to accomplish installation.

Cultural Resources: Three sites are recommended for direct protection measures, including Camp Reno, a prehistoric multi-room compound within Camp Reno, and ruins. Camp Reno would benefit from an installation of a gate before entering the site boundaries and the other sites would benefit from an administrative closure with signage of FSR699 off of FSR445. The additional 10 sites would benefit from indirect treatment of closure of the fire area to protect human life and safety. This would, alternatively, help the additional 500 sites located within the fire perimeter, to regain vegetation to cover site locations from the opportunistic looter.

Channel Treatments: Based on soil burn severity through riparian areas within the Bush Fire burn scar, channel treatments are recommended to protect Forest Service property and resources (roads and parking lots). Work would include, but not be limited to, removal and clearing of dead and down material in the following areas:

- Mesquite Wash for 2 miles from crossing with SR 87 to protect life and safety in the Sycamore Creek OHV area and FSR 11, at a cost of approximately (b) (5) , and
- Fox Gulch for a ¼ mile above the crossing with FSR 445 (-111.29 33.728) and Rock Creek for a ¼ mile above crossing with FSR 445 (-111.299 33.72), at a cost of approximately (b) (5)

Roads and Trail Treatments: To help protect life and safety and BAER critical infrastructure**,** road treatments on Forest Service Road 626 are recommended. Forest Service Road 626 leads to a Forest Service radio repeater at the summit of Mt. Ord. This repeater serves as a critical communication link for multiple districts on the Tonto National Forest. Proposed treatments include installing reinforced, armored rolling dips, re-establishing ditches, cleaning sediment and debris from existing culvert inlets, reinforcing existing culvert outlets, installing BAER signs, grading and hardening segments of damaged road, and reinforcing eroded shoulders and slopes along edge of roadway. These treatments will provide adequate road drainage and reduce potential damage to road infrastructure. The cost for the proposed treatment is (b) (5) At the time of this report work on hardening Forest Service road 626 has begun.

Proposed treatments are located along the first 3.7 miles of Mt Ord Road (FSR 626) beginning at the first cattle guard (MP 0.4) and ending at its intersection with Old Mt Ord Road (FSR 27). Location sites are as follows:

- 2 locations - remove debris and sediment from existing culverts inlets

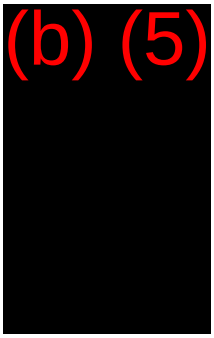
- 10 locations – install reinforced, armored rolling dips with rock spillways
- 2 locations – reinforce culvert outlets – install diffusers, backfill around culvert outlets, and add
    - riprap to first location and boulders/gabion baskets to second location
- 2 locations – reinforce slopes along edge of road
- 2 locations – install one BAER sign at each location
- 1 location - establish ditch adjacent to cattle guard. Reinforce eroded areas around cattle guard.
- Spot grading and hardening of roadway. Total length of grading and hardening is
    - approximately 1.25 miles
- Re-establish/clean ditches (approximately 1.25 miles)

Recommendations outside of those directly tied to consideration of human life and public safety include performing treatment on non-motorized trails, especially the AZNST, to improve hydrologic function, soil stability, and trail identifiability (i.e. clear tread path). We recommend minimizing loss of trail infrastructure from post-fire storms by working with partners and stakeholders (i.e. AZCC) to perform emergency stabilization of the trail tread, construct necessary erosion features and trail tread hardening, remove hazards, and maintain the scenic integrity of the trail systems—especially the AZNST. The estimated cost is (b) (5) for 15 trail crew hitches, and (b) (5) for 7 pack mule teams severity (see Recreation Resource Report for cost breakdown).

Protection/Safety Treatments: For the protection of human life and public safety, a total of 5 gates (including 1 heavy duty) will be installed where: FR143 meets Highway 87, FR143 meets Highway 188, FR524 meets FR491, FR385 meets Highway 87, and FR3532 meets Highway 87. The purpose of these gate is prevent the public being able to access the burn area, established and dispersed recreation sites and established and dispersed camping areas that are expected to experience increased flooding and debris flows. Installation of Warning and Closure signs will occur at entry points of the closure area and in adjacent areas that may see increased flooding and debris flows as identified during assessment. The cost for gate and signs to protect human life and safety totals (b) (5) At the time of this report specification work for the gates is complete and contracting for installation has been initiated. The purchase orders for additional signs has been submitted and already available signs are being installed by district staff.

Treatments to reestablish vegetation at the Little Daisy Repository former mill site were developed in coordination with the Regional Environmental Engineer to ensure slope stability and to eliminate the threat of the release of hazardous materials into the Sycamore Creek watershed. To minimally ensure a successful revegetation, erosion control features, site barriers, and a gate should be part of this treatment, at an estimated cost of (b) (5) which breakdowns as follows, consistent with the project treatment specification sheet:

Personnel Service Cost
Travel Cost
Mobilization, 10% of Contract Amount
Hydraulic Seeding, Bonded fiber mulch matrix
Road Obliteration, Including Seeding
Road Reconditioning Scarifying and Shaping
Furnish and Install 4 Strand Barb Wire Fence
Removal of Single Fallen Tree Obstruction
Gate Installation



Lastly, we recommend consideration of an area closure to protect the public from the threat of post-fire flooding and debris flows. In consideration of the typical timing of summer monsoons, fall tropical storms, and winter rains, the planning horizon for an area closure should extend to March 15, 2021. Current local conditions and other planning considerations should continually be re-assessed to re-evaluate the need to maintain and/or modify a closure.

I. Monitoring Narrative:

Monitoring methodologies will be determined by resource based on site and program specific considerations, and consistent with recommendations presented in the relevant specialist reports. Overall Bush BAER implementation reporting will be provided on the BAER Final Accomplishment Report Form template.

Total Cost reflected in Part VI – Emergency Stabilization Treatments and Source of Funds:

- The Initial and Interim #1 2500-8 reports had entries for Substantial Closure Gates at $20,000 and Standard Closure Gate at $10,000 that were subsumed by gate costs reflected in Interim #2. The total amount requested through Interim #2 was $196,234 rather than $226,234 as reflected in the Regional Approval letters. That $30,000 has been removed from the total below for Previously Approved.
- Interim #2 estimated a cost of (b) (5) or Mt Ord Road Hardening, but the actual dollar amount expended to complete that treatment was $16,403. Interim #2 also estimated a total cost for Warning Signs at $20,750, but the actual dollar amount expended to acquire signage was $19,965. Accordingly, the total implementation savings realized to date is $73,381, reflected here as Cost Savings. This amount has been subtracted from the Total cost of treatments below.

PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS

			NFS Lands				Other Lands				All
		Unit	# of		Other	# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER $	$	units	$	Units	$	$
A. Land Treatments										
Noxious Invasive Weeds				(b) (5)			(b) (5)			
Mud Springs T&E Fish										
Insert new items above this line!										$0
Subtotal Land Treatments										$0
B. Channel Treatments										
Mesquite Wash				(b) (5)						
Fox Gulch										
Insert new items above this line!							(b) (5)			$0
Subtotal Channel Treatments										$0
C. Road and Trails										
Mt Ord road Hardening	ea			(b) (5)			(b) (5)			
Trail Crew Hitch										
Pack Mule Team										
Insert new items above this line!										$0
Subtotal Road and Trails										$0
D. Protection/Safety										
Warning signs	ea			(b) (5)			(b) (5)			
Warning signs	ea									
Heavy Duty Closure Gate	ea									
Standard Gate (Single)	ea									
Standard Gate (Double)	ea									
Little Daisy Repository										
Insert new items above this line!										$0
Subtotal Protection/Safety										$0
E. BAER Evaluation										
Initial Assessment	Report			(b) (5)			(b) (5)			$0
Insert new items above this line!										$0
Subtotal Evaluation										$0
F. Monitoring										
Insert new items above this line!										$0
Subtotal Monitoring										$0
G. Totals				$466,563	$0					**$0**
Cost Savings				$73,381						
Previously approved				$196,234						
Total for this request				**$343,710**						

PART VII - APPROVALS

NEIL BOSWORTH Digitally signed by NEIL BOSWORTH
Date: 2020.08.21 14:04:49 -07'00'

1. _____

Forest Supervisor Date